

Forensic Science | 9.2 Entomology Lab

Blowfly Introduction

The blow fly lays its eggs on dead animals to provide food for its carnivorous larvae as they hatch. This means that in nature, the life cycle of the blow fly is part of the decomposition process of dead bodies. The study of this phenomenon by entomologists has led to our ability to estimate the time since death by examining which stage of growth blow fly is in when found on the cadaver. The forensic entomologist conducts examinations at crime scenes and examines the insect evidence found there to bring evidence to court cases involving human cadavers. To make a determination, the scientist makes visual observations, collects insect evidence, determines the stages of development, and calculates the time of initial deposit of the blow fly eggs on the cadaver. In the laboratory the scientist rears collected specimens to confirm the species and more accurately establish the stage of growth. They then compile their findings and make a “best guess estimate” as to how long the cadaver has been dead.

If you struggle with the math in this assignment, please go back into the lesson and complete/review the practice activity. The activity will provide you with sample problems with including answers.

Data Table:

Accumulated Degree Hour of Green Bottle Fly				
<i>From</i>	<i>To</i>	<i>Temperature</i>	<i>Hours</i>	<i>ADH (accumulated degree hour)</i>
Egg	First instar	70° F	23	$70 \times 23 = 1610$ ADH
First instar	Second Instar	70° F	27	$70 \times 27 = 1890$ ADH
Second Instar	Third Instar	70° F	22	$70 \times 22 = 1540$ ADH
Third Instar	Pupa	70° F	130	$70 \times 130 = 9100$ ADH
Pupa	Adult Fly	70° F	143	$70 \times 143 = 10010$ ADH
Totals				

Using the above data as the reference, calculate and answer the following. (5 points each)

1. How many total hours does it take for a green bottle fly egg to become an adult fly?

345 hours

2. Convert these hours to days and hours: Days 14 Hours 9

Hint: If you know there are 24 hours in one day, then you can divide the total hours you calculated for #1 by 24. The whole number is the days, and the remainder is the hours. This is easiest to do by hand as the calculator will produce a decimal answer that will need to be converted to minutes. However, if you are comfortable with the conversion, that is an acceptable way to generate the correct answer.

Calculation

3. For a maggot at the beginning of the second instar stage how many hours and minutes does it take to reach the third instar if the ambient temperature is at 75° F? Round your answer to the nearest minute.

20 hours 32 minutes

Hint: The ADH needed for the development of second instar to third instar is 1540 ADH at 70° F. You calculated this by multiplying the temperature by the days ($70 \times 22 = 1540$). So, if you want to know how the additional a change in temperature would affect the hours in that stage, you could use your division skills ($1540/\text{temperature in question} = \text{hours}$).

Analysis

4. Describe in your own words how insect life cycle can be used in estimating the time of death?

We know how long it takes for insects to go through their stages of life. We can look at what stage of life they are in to determine how long ago the person died.

